

N. Minnifield

1645

RAW SEQUENCE LISTING  
 PATENT APPLICATION: **US/09/117,447**

DATE: 06/12/2000  
 TIME: 16:05:34

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3 <110> APPLICANT: LUBITZ, Werner  
 4 SLEYTR, Uwe  
 5 KUEN, Beatrix  
 6 TRUPPE, Michaela  
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 10 SARA, Margit  
 12 <120> TITLE OF INVENTION: RECOMBINANT EXPRESSION OF S-LAYER PROTEINS  
 14 <130> FILE REFERENCE: 100564-08013  
 16 <140> CURRENT APPLICATION NUMBER: 09/117,447  
 17 <141> CURRENT FILING DATE: 1998-12-02  
 19 <150> PRIOR APPLICATION NUMBER: PCT/EP97/00432  
 20 <151> PRIOR FILING DATE: 1997-01-31  
 22 <150> PRIOR APPLICATION NUMBER: DE/196 03 649.6  
 23 <151> PRIOR FILING DATE: 1996-02-01  
 25 <160> NUMBER OF SEQ ID NOS: 10  
 27 <170> SOFTWARE: PatentIn Ver. 2.1  
 29 <210> SEQ ID NO: 1  
 30 <211> LENGTH: 3687  
 31 <212> TYPE: DNA  
 32 <213> ORGANISM: *Bacillus stearothermophilus*  
 34 <220> FEATURE:  
 35 <221> NAME/KEY: CDS  
 36 <222> LOCATION: (1)..(3684)  
 38 <220> FEATURE:  
 39 <221> NAME/KEY: sig\_peptide  
 40 <222> LOCATION: (1)..(90)  
 42 <220> FEATURE:  
 43 <221> NAME/KEY: mat\_peptide  
 44 <222> LOCATION: (91)..(3684)  
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 51 gca agt gca ttt gtc gct gca aat cca aac gct tct gaa gcg gct aca 96  
 52 Ala Ser Ala Phe Val Ala Ala Asn Pro Asn Ala Ser Glu Ala Ala Thr  
 53 -10 -5 -1 1  
 55 gat gta gca aca gta gta agc caa gca aaa gca cag ttc aaa aaa gca 144  
 56 Asp Val Ala Thr Val Val Ser Gln Ala Lys Ala Gln Phe Lys Ala  
 57 5 10 15  
 59 tac tat act tac agc cat aca gta acg gaa act ggt gaa ttc cca aac 192  
 60 Tyr Tyr Thr Tyr Ser His Thr Val Thr Glu Thr Gly Glu Phe Pro Asn  
 61 20 25 30  
 63 att aac gat gta tat gct gaa tac aac aaa gcg aaa aaa cga tac cgt  
 64 Ile Asn Asp Val Tyr Ala Glu Tyr Asn Lys Ala Lys Lys Arg Tyr Arg  
 65 35 40 45 50

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68 Asp	Ala	Val	Ala	Leu	Val	Asn	Lys	Ala	Gly	Gly	Ala	Lys	Lys	Asp	Ala	
69				55				60				65				
71 tac	tta	gct	gtt	tta	caa	aaa	gaa	tat	gaa	act	tac	gtt	tcc	aaa	gca	336
72 Tyr	Leu	Ala	Asp	Leu	Gln	Lys	Glu	Tyr	Glu	Thr	Tyr	Val	Phe	Lys	Ala	
73				70				75				80				
75 aac	cct	aaa	tct	ggc	gaa	gct	cgt	gtt	gca	act	tac	atc	gat	gct	tac	384
76 Asn	Pro	Lys	Ser	Gly	Glu	Ala	Arg	Val	Ala	Thr	Tyr	Ile	Asp	Ala	Tyr	
77				85				90				95				
79 aac	tat	gca	aca	aaa	tta	gac	gaa	atg	cgc	caa	gag	cta	gag	gct	gct	432
80 Asn	Tyr	Ala	Thr	Lys	Leu	Asp	Glu	Met	Arg	Gln	Glu	Leu	Glu	Ala	Ala	
81				100				105				110				
83 gtt	caa	gca	aaa	gat	tta	gaa	aaa	gca	gaa	caa	tac	tat	cac	aaa	att	480
84 Val	Gln	Ala	Lys	Asp	Leu	Glu	Lys	Ala	Glu	Gln	Tyr	Tyr	His	Lys	Ile	
85 115					120				125				130			
87 cct	tat	gaa	att	aaa	act	cgc	aca	gtc	att	tta	gat	cgc	gtt	tat	ggt	528
88 Pro	Tyr	Glu	Ile	Lys	Thr	Arg	Thr	Val	Ile	Leu	Asp	Arg	Val	Tyr	Gly	
89					135				140				145			
91 aaa	aca	act	cgt	gtt	tta	ctt	cgc	tct	aca	ttt	aaa	gca	aaa	gca	caa	576
92 Lys	Thr	Thr	Arg	Asp	Leu	Leu	Arg	Ser	Thr	Phe	Lys	Ala	Lys	Ala	Gln	
93					150				155				160			
95 gaa	caa	cgc	gac	agc	tta	att	tat	gat	att	acc	gtt	gca	atg	aaa	gct	624
96 Glu	Leu	Arg	Asp	Ser	Leu	Ile	Tyr	Asp	Ile	Thr	Val	Ala	Met	Lys	Ala	
97					165				170				175			
99 cgc	gaa	gtt	caa	gac	gct	gtg	aaa	gca	ggc	aat	tta	gac	aaa	gct	aaa	672
100 Arg	Glu	Val	Gln	Asp	Ala	Val	Lys	Ala	Gly	Asn	Leu	Asp	Lys	Ala	Lys	
101					180				185				190			
103 gct	gct	gtt	gat	caa	atc	aat	caa	tac	tta	cca	aaa	gta	aca	gat	gct	720
104 Ala	Ala	Val	Asp	Gln	Ile	Asn	Gln	Tyr	Leu	Pro	Lys	Val	Thr	Asp	Ala	
105 195						200				205				210		
107 ttc	aaa	act	gaa	cta	aca	gaa	gtt	aaa	aaa	gca	tta	gat	gca	gat	768	
108 Phe	Lys	Thr	Glu	Leu	Thr	Glu	Val	Ala	Lys	Lys	Ala	Leu	Asp	Ala	Asp	
109						215				220				225		
111 gaa	gac	gtt	ctt	act	cca	aaa	gtt	gaa	agt	gtt	act	gct	att	aaa	act	816
112 Glu	Ala	Ala	Leu	Thr	Pro	Lys	Val	Glu	Ser	Val	Ser	Ala	Ile	Asn	Thr	
113						230				235				240		
115 caa	aac	aaa	gct	gtt	gaa	tta	aca	gca	gtt	cca	gtg	aac	gga	aca	cta	864
116 Gln	Asn	Lys	Ala	Val	Glu	Leu	Thr	Ala	Val	Pro	Val	Asn	Gly	Thr	Leu	
117						245				250				255		
119 aaa	tta	caa	ctt	tca	gtc	gtt	gca	aat	gaa	gat	aca	gtt	aaa	gtt	aat	912
120 Lys	Glu	Leu	Gln	Leu	Ser	Ala	Ala	Asn	Glu	Asp	Thr	Val	Asn	Val	Asn	
121						260				265				270		
123 act	gtt	gtt	atc	tat	aaa	gtg	gac	ggt	aat	ttt	gcc	ctt	aat		960	
124 Thr	Val	Arg	Ile	Tyr	Lys	Val	Asp	Gly	Asn	Ile	Pro	Phe	Ala	Leu	Asn	
125 275						275				280				285		290
127 acg	gca	gat	gtt	tct	tta	tct	aca	gac	gga	aaa	act	atc	act	gtt	gat	1008
128 Thr	Ala	Asp	Val	Ser	Leu	Ser	Thr	Asp	Gly	Lys	Thr	Ile	Thr	Val	Asp	
129							295			300				305		
131 gct	tcg	act	cca	tcc	gaa	aat	aat	acg	gag	tat	aaa	gta	gtt	aaa	1056	

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132 Ala Ser Thr Pro Phe Glu Asn Asn Thr Glu Tyr Lys Val Val Val Lys	
133 310 315 320	
135 ggt att aaa gac aaa aat ggc aaa gaa ttt aaa gaa gat gca ttc act	1104
136 Gly Ile Lys Asp Lys Asn Gly Lys Glu Phe Lys Glu Asp Ala Phe Thr	
137 325 330 335	
139 ttc aag ctt cga aat gat gct gta gtt act caa gtg ttt gga act aat	1152
140 Phe Lys Leu Arg Asn Asp Ala Val Val Thr Gln Val Phe Gly Thr Asn	
141 340 345 350	
143 gta aca aac aac act tct gta aac tta gca gca ggt act ttc gac act	1200
144 Val Thr Asn Asn Thr Ser Val Asn Leu Ala Ala Gly Thr Phe Asp Thr	
145 355 360 365 370	
147 gac gat act tta aca gta gta ttt gat aag ttg tta gca cct gaa act	1248
148 Asp Asp Thr Leu Thr Val Val Phe Asp Lys Leu Leu Ala Pro Glu Thr	
149 375 380 385	
151 gta aac aac act att aca gat gtt gaa act gga aaa cgc	1296
152 Val Asn Ser Ser Asn Val Thr Ile Thr Asp Val Glu Thr Gly Lys Arg	
153 390 395 400	
155 att cca gta att gca tct act tct ggt tct aca att act att acg tta	1344
156 Ile Pro Val Ile Ala Ser Thr Ser Gly Ser Thr Ile Thr Ile Thr Leu	
157 405 410 415	
159 aaa gaa gcg tta gta act ggt aaa caa tat aaa ctt gct atc aat aat	1392
160 Lys Glu Ala Leu Val Thr Gly Lys Gln Tyr Lys Leu Ala Ile Asn Asn	
161 420 425 430	
163 gtt aaa aca tta act ggt tac aat gca gaa gct tac gag tta gtg ttc	1440
164 Val Lys Thr Leu Thr Gly Tyr Asn Ala Glu Ala Tyr Glu Leu Val Phe	
165 435 440 445 450	
167 act gca aac gca tca gca cca act gtt gct acc gct cct act act tta	1488
168 Thr Ala Asn Ala Ser Ala Pro Thr Val Ala Thr Ala Pro Thr Thr Leu	
169 455 460 465	
171 ggt ggt aca act tta tct act ggt tct ctt aca aca aat gtt tgg ggt	1536
172 Gly Gly Thr Thr Leu Ser Thr Gly Ser Leu Thr Thr Asn Val Trp Gly	
173 470 475 480	
175 aaa ttg gct ggt ggt gtt gaa gct gga act tat tat cct ggt ctt	1584
176 Lys Leu Ala Gly Gly Val Asn Glu Ala Gly Thr Tyr Pro Gly Leu	
177 485 490 495	
179 caa ttc aca aca acg ttt gct act aag tta gac gaa tct act tta gct	1632
180 Gln Phe Thr Thr Phe Ala Thr Lys Leu Asp Glu Ser Thr Leu Ala	
181 500 505 510	
183 gat aac ttt gta tta gtt gaa aaa gaa tct ggt aca gtt gtt gct tct	1680
184 Asp Asn Phe Val Leu Val Lys Glu Ser Gly Thr Val Val Ala Ser	
185 515 520 525 530	
187 gaa cta aaa tat aat gca gac gct aaa atg gta act tta gtg cca aaa	1728
188 Glu Leu Lys Tyr Asn Ala Asp Ala Lys Met Val Thr Leu Val Pro Lys	
189 535 540 545	
191 gcg gac ctt aaa gaa aat aca atc tat caa atc aaa att aaa aaa ggc	1776
192 Ala Asp Leu Lys Glu Asn Thr Ile Tyr Gln Ile Lys Ile Lys Gly	
193 550 555 560	
195 ttg aag tcc gat aaa ggt att gaa tta ggc act gtt aac gag aaa aca	1824
196 Leu Lys Ser Asp Lys Gly Ile Glu Leu Gly Thr Val Asn Glu Lys Thr	

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197	565	570	575	
199	tat gag ttc aaa act caa gac tta act gct cct aca gtt att agc gta			1872
200	Tyr Glu Phe Lys Thr Gln Asp Leu Thr Ala Pro Thr Val Ile Ser Val			
201	580	585	590	
203	acg tct aaa aat ggc gac gct gga tta aaa gta act gaa gct caa gaa			1920
204	Thr Ser Lys Asn Gly Asp Ala Gly Leu Lys Val Thr Glu Ala Gln Glu			
205	595	600	605	610
207	ttt act gtg aag ttc tca gag aat tta aat aca ttt aat gct aca acc			1968
208	Phe Thr Val Lys Phe Ser Glu Asn Leu Asn Thr Phe Asn Ala Thr Thr			
209	615	620	625	
211	gtt tcg ggt agc aca atc aca tac ggt caa gtt gct gta gta aaa gcg			2016
212	Val Ser Gly Ser Thr Ile Thr Tyr Gly Gln Val Ala Val Val Lys Ala			
213	630	635	640	
215	ggt gca aac tta tct gct ctt aca gca agt gac atc att cca gct agt			2064
216	Gly Ala Asn Leu Ser Ala Leu Thr Ala Ser Asp Ile Ile Pro Ala Ser			
217	645	650	655	
219	gtt gaa gcg gtt act ggt caa gat gga aca tac aaa gtg aaa gtt got			2112
220	Val Glu Ala Val Thr Gly Gln Asp Gly Thr Tyr Lys Val Lys Val Ala			
221	660	665	670	
223	gct aac caa tta gaa cgt aac caa ggg tac aaa tta gta gtg ttc ggt			2160
224	Ala Asn Gln Leu Glu Arg Asn Gln Gly Tyr Lys Leu Val Val Phe Gly			
225	675	680	685	690
227	aaa ggt gca aca gct cct gtt aaa gat gct gca aat gca aat act tta			2208
228	Lys Gly Ala Thr Ala Pro Val Lys Asp Ala Ala Asn Ala Asn Thr Leu			
229	695	700	705	
231	gca act aac tat atc tat aca ttt aca act gaa ggt caa gac gta aca			2256
232	Ala Thr Asn Tyr Ile Tyr Thr Phe Thr Thr Glu Gly Gln Asp Val Thr			
233	710	715	720	
235	gca cca acg gtt aca aaa gta ttc aaa ggt gat tct tta aaa gac gct			2304
236	Ala Pro Thr Val Thr Lys Val Phe Lys Gly Asp Ser Leu Lys Asp Ala			
237	725	730	735	
239	gat gca gtt act aca ctt acg aac gtt gat gca ggt caa aaa ttc act			2352
240	Asp Ala Val Thr Thr Leu Thr Asn Val Asp Ala Gly Gln Lys Phe Thr			
241	740	745	750	
243	atc caa ttt agc gaa tta aaa act tct agt ggt tct tta gtg ggt			2400
244	Ile Gln Phe Ser Glu Glu Leu Lys Thr Ser Ser Gly Ser Leu Val Gly			
245	755	760	765	770
247	ggc aaa gta act gtc gag aaa tta aca aac aac gga tgg gta gat gct			2448
248	Gly Lys Val Thr Val Glu Lys Leu Thr Asn Asn Gly Trp Val Asp Ala			
249	775	780	785	
251	ggt act gga aca act gta tca gtt gct cct aag aca gat gca aat ggt			2496
252	Gly Thr Gly Thr Val Ser Val Ala Pro Lys Thr Asp Ala Asn Gly			
253	790	795	800	
255	aaa gta aca gct gct gtg gtt aca tta act ggt ctt gac aat aac gac			2544
256	Lys Val Thr Ala Ala Val Val Thr Leu Thr Gly Leu Asp Asn Asn Asp			
257	805	810	815	
259	aaa gat gcg aaa ttg cgt ctg gta gta gat aag tct tct act gat gga			2592
260	Lys Asp Ala Lys Leu Arg Leu Val Val Asp Lys Ser Ser Thr Asp Gly			
261	820	825	830	

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263 att gct gat gta gct ggt aat gta att aag gaa aaa gat att tta att	2640
264 Ile Ala Asp Val Ala Gly Asn Val Ile Lys Glu Lys Asp Ile Leu Ile	
265 835 840 845 850	850
267 cgt tac aac agc tgg aga cac act gta gct tct gtg aaa gct gct gct	2688
268 Arg Tyr Asn Ser Trp Arg His Thr Val Ala Ser Val Lys Ala Ala Ala	
269 855 860 865	865
271 gac aaa gat ggt caa aac gct tct gca ttc cca aca agc act gca	2736
272 Asp Lys Asp Gly Gln Asn Ala Ser Ala Ala Phe Pro Thr Ser Thr Ala	
273 870 875 880	880
275 att gat aca act aag agc tta tta gtt gaa ttc aat gaa act gat tta	2784
276 Ile Asp Thr Thr Lys Ser Leu Leu Val Glu Phe Asn Glu Thr Asp Leu	
277 885 890 895	895
279 gcg gaa gtt aaa cct gag aac atc gtt gtt aaa gat gca gca ggt aat	2832
280 Ala Glu Val Lys Pro Glu Asn Ile Val Val Lys Asp Ala Ala Gly Asn	
281 900 905 910	910
283 gcg gta gct ggt act gta aca gca tta gac ggt tct aca aat aaa ttt	2880
284 Ala Val Ala Gly Thr Val Ala Leu Asp Gly Ser Thr Asn Lys Phe	
285 915 920 925 930	930
287 gta ttc act cca tct caa gaa tta aaa gct ggt aca gtt tac tct gta	2928
288 Val Phe Thr Pro Ser Gln Glu Leu Lys Ala Gly Thr Val Tyr Ser Val	
289 935 940 945	945
291 aca att gac ggt gtg aga gat aaa gta ggt aac aca atc tct aac tac	2976
292 Thr Ile Asp Gly Val Arg Asp Lys Val Gly Asn Thr Ile Ser Lys Tyr	
293 950 955 960	960
295 att act tcg ttc aag act gta tct gcg aat cca acg tta tct tca atc	3024
296 Ile Thr Ser Phe Lys Thr Val Ser Ala Asn Pro Thr Leu Ser Ser Ile	
297 965 970 975	975
299 agc att gct gac ggt gca gtt aac gtt gac cgt tct aaa aca att aca	3072
300 Ser Ile Ala Asp Gly Ala Val Asn Val Asp Arg Ser Lys Thr Ile Thr	
301 980 985 990	990
303 att gaa ttc agc gat tca gtt cca aac cca aca atc act ctt aag aag	3120
304 Ile Glu Phe Ser Asp Ser Val Pro Asn Pro Thr Ile Thr Leu Lys Lys	
305 995 1000 1005 1010	1010
307 gct gac gga act tca ttt act aat tac act tta gta aat gta aat aat	3168
308 Ala Asp Gly Thr Ser Phe Thr Asn Tyr Thr Leu Val Asn Val Asn Asn	
309 1015 1020 1025	1025
311 gaa aat aaa aca tac aaa att gta ttc cac aaa ggt gta aca ctt gac	3216
312 Glu Asn Lys Thr Tyr Lys Ile Val Phe His Lys Gly Val Thr Leu Asp	
313 1030 1035 1040	1040
315 gag ttt act caa tat gag tta gca gtt tca aat gat ttt caa act ggt	3264
316 Glu Phe Thr Gln Tyr Glu Leu Ala Val Ser Lys Asp Phe Gln Thr Gly	
317 1045 1050 1055	1055
319 act gat att gat agc aaa gtt aca ttc atc aca ggt tct gtt gct act	3312
320 Thr Asp Ile Asp Ser Lys Val Thr Phe Ile Thr Gly Ser Val Ala Thr	
321 1060 1065 1070	1070
323 gac gaa gta aaa cct gct cta gta ggc gtt ggt tca tgg aat gga aca	3360
324 Asp Glu Val Lys Pro Ala Leu Val Gly Val Gly Ser Trp Asn Gly Thr	
325 1075 1080 1085 1090	1090
327 agc tat act cag gat gct gca gca aca cgt ctt cgg tct gta gct gac	3408

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